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Drive unit placement and cover for lift - has drive and control unit placed in space beside shaft covered by openable cover

KONE ELEVATOR GMBH 29.08.89-FI-004039

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The drive unit (4) for a lift, the drive unit (4) is placed in a space (8) provided at the side of the lift shaft (1) below the lowest landing.

The machine space (8) has a cover (25) which is rotatbly mounted with a hinge (24) in the upper part of the. space (8). When erected the cover forms a safety fence the drive unit (4) and control unit can be' mfd. As a single unit and encased in concrete when place.

USE/ADVANTAGE - Placement of lift drive unit negates need for separate machine room, so building is simplified and there is less wear on ropes.(8pp Dwg.No.1/5)

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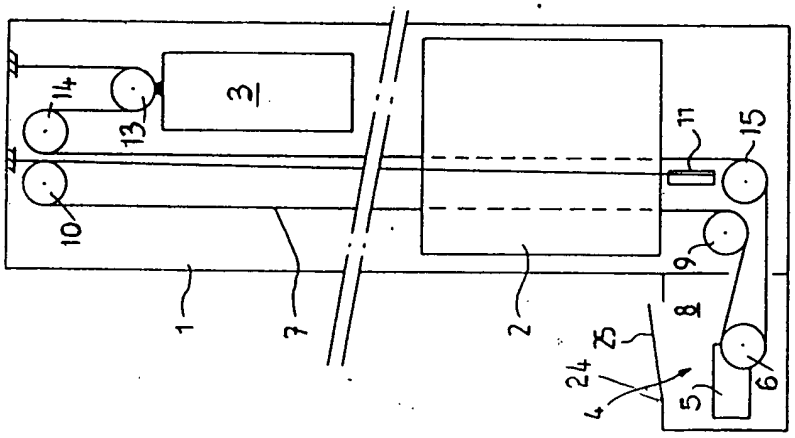

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(54) Placement of a drive unit for an elevator.

(57) An elevator comprising an elevator car (2) travelling in an elevator shaft (1), at least one vertical guide rail , a control unit for controlling the elevator, a driving machine (4) for moving the elevator car and a means (7) for transmitting the driving power from the machine to the elevator car. The invention is so implemented that the driving machine (4) and the control unit of the elevator are placed in a space (8) provided beside the elevator shaft (1) below the lowest landing, whereby said space (8) is covered at the top by an openable cover structure (25).

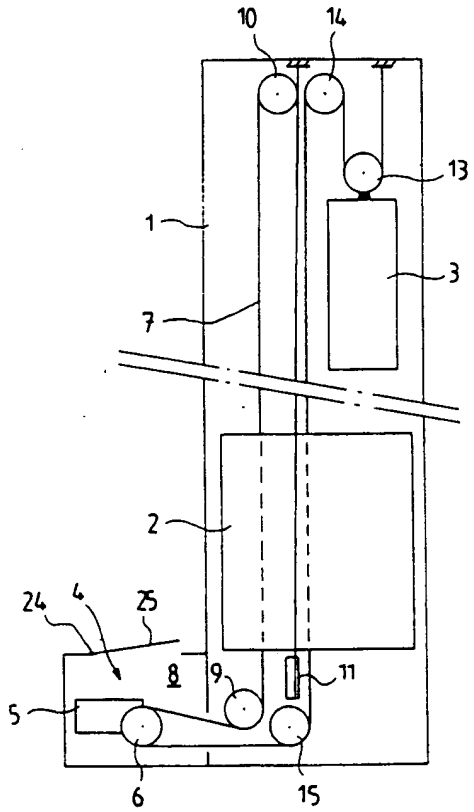

Fig.1

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PLACEMENT OF A DRIVE UNIT FOR AN ELEVATOR

The present invention relates to an elevator comprising an elevator car travelling in an elevator shaft, at least one vertical guide rail, a control unit for controlling the elevator, a machine for driving the elevator car and a means for transmitting the driving power from the machine to the elevator car, the driving machine and the control unit of the elevator being placed in a space provided beside the elevator shaft (1) below the lowest landing,

In previously known elevator constructions, the machine is generally placed above the elevator shaft. However, this is in many cases an impractical and expensive solution because it usually requires a separate machine room in the attic of the building. For this reason, efforts have been made to produce systems in which the driving machine is placed somewhere lower down.

FI-patent publication 50864 describes a solution in which the rope suspension is so implemented that the driving machine can be placed lower down. In this solution, the lifting rope runs from the elevator car to the machine via a diverting pulley placed at the top end of a guide rail, said pulley being so mounted on the guide rail that the latter receives the load imposed on the pulley by the lifting rope. In other words, the elevator car and its load are supported by one or more guide rails.

The object of the present invention is to achieve a space-saving solution that is also easy to maintain. The invention is characterized in that the space where the driving machine and the control unit of the elevator are placed is covered at the top by an openable cover structure.

A preferred embodiment of the invention is characterized in that the cover structure forms a safety fence when opened.

Another preferred embodiment of the invention is characterized in that the space together with its equipment is manufactured in factory and transported and installed as a complete unit.

The invention offers many advantages as compared to previously known techniques. One of them is that no separate machine room is required. The fact that the machine space is placed in conjunction with the bottom well off the elevator shaft reduces the costs as compared to the building of a separate machine room. The machine space is of a size that allows it to be manufactured in factory and transported and installed as a complete unit. An ordinary machine room is too large to be produced in this way. The machine space can be so placed that the noise of the machine will cause only minimal disturbance to the people living in the building. The electricity supply cables required are shorter than in the case of a machine placed on top of the shaft. If a traction sheave machine is used, the angle of contact between the rope and the traction sheave is over 180°. In traditional elevator suspension, this angle is under 180°. The required friction force is therefore achieved with a smaller undercut of the groove, which means that the ropes will last longer. The machine space of the elevator is more easily accessible for maintenance. It also makes it easier to enter the space under the car during installation.

In the following, the invention is described by the aid of examples of preferred embodiments, reference being made to the drawing attached, wherein:

Fig. 1 shows a lateral view of a solution representing an embodiment of the invention.

Fig. 2 shows a top view of the solution of fig. 1 in a larger scale.

Fig. 3 shows a lateral view of a solution representing an another embodiment of the invention.

Fig. 4 shows a top view of the solution of fig. 3 in a larger scale.

Fig. 5 shows yet another embodiment of the invention in lateral view.

Fig. 1 shows an elevator shaft 1 accommodating a car 2 and a counterweight 3. The elevator car is driven by means of a lifting rope (or lifting ropes) 7 by a driving machine 4, which in this embodiment consists of a motor 5, a traction sheave 6 and a power transmission 23 placed between them (fig.2). As provided by the invention, the driving machine is placed in a space 8 provided for it beside the elevator shaft 1 below the lowest landing. The lifting rope runs from the traction sheave 6 to a diverting pulley 9 placed below the elevator car and then up over a diverting pulley 10 at the top of the elevator shaft, then down again round a diverting pulley 11 and further round another diverting pulley 12 (fig. 2) placed at the same horizontal level but on the opposite side of the car, from where it runs up again and is anchored at the top of the shaft. Diverting pulleys 11 and 12 are mounted e.g. at the bottom of the elevator car, so that the car will move along with these pulleys. The opposite end of the lifting rope is also anchored at the shaft top, from where it runs down round a diverting pulley 13 attached to and moving the counterweight 3, then up again round another diverting pulley 14, from where the rope runs down towards the bottom of the shaft, passes round a diverting pulley 15 and goes further to the traction sheave 6. The elevator shaft is naturally provided with at least one guide rail 16 (fig. 2) for the car. Fig. 2 shows several parallel lifting ropes, whereas in fig. 1, for the sake of clarity, only one rope is

shown. As regards the invention, the number of ropes is in no way limited.

The machine space 8 is provided with a cover 25, which is turnably mounted with a hinge 24 in the top part of the space. In fig. 2, the cover is shown in a partly open position. If necessary, the cover may consist of more than one wicket, e.g. three wickets opening in different directions.

Figures 3 and 4 present another embodiment of the invention, in which the elevator is driven by a drum machine. In this case, no counterweight is needed, so the rope suspension is simpler. The machine 4 is again placed in a space provided for it beside the elevator shaft below the lowest landing. In this embodiment, the machine consists of a motor 5 and a drum 17 rotated by it, the lifting rope(s) being attached to the drum. The power transmission between the motor and the drum is not shown, but it can be implemented in any conventional way. The rope runs from the drum 17 to a diverting pulley 18 below the elevator car 2 and then round another diverting pulley 19 at the top of the shaft, from where it returns down to a diverting pulley 11 mounted on the elevator car. Again, the rope passes round another diverting pulley 12 (fig. 4) provided on the other side of the car and goes up to its anchorage at the top of the shaft. Fig. 3 does not show the cover structure, but it may be e.g. as presented in fig. 1. Note that diverting pulleys 18, 11 and 12 in fig. 4 are presented somewhat misleadingly, for, as shown in fig. 3, they are located below the elevator car, not above it as suggested by fig. 4. However, the aim has been to show the diverting pulleys in a complete form to give a clearer idea of the rope suspension arrangements.

Fig. 5 illustrates an embodiment in which the invention is applied to a hydraulic elevator. The arrangement comprises a driving machine 4 consisting of a motor and a hydraulic unit known in themsleves. The hydraulic unit is connected to the oil space of a hydraulic cylinder 21 by an oil pipe 20. The piston 22 moving in the cylinder is directly attached to the elevator car 2.

A preferred embodiment is so implemented that the cover structure 25 forms a safety fence when opened.

The machine space 8 and the equipment belonging to it, such as the elevator machine 4 and its control unit, can be manufactured in factory and installed as a single package. In this case it is possible to mount the package in place, e.g. by encasing it in concrete.

In the embodiments described above, the machine space is placed on the front side of the elevator car, i.e. on that side where the elevator doors are located, where generally there is more free space available than elsewhere. However, the machine space can just as well be placed on any other side of the shaft if necessary.

It is obvious to a person skilled in the art that different embodiments of the invention are not restricted to the examples described above, but that they may instead be varied within the scope of the following claims. Thus, e.g. a hydraulic elevator need not necessarily be of the direct-acting type as illustrated by fig. 5, but indirect-acting hydraulic elevators are also possible.

Claims

1. An elevator comprising an elevator car (2) travelling in an elevator shaft (1), at least one vertical guide rail (16), a control unit for controlling the elevator, a driving machine (4) for moving the elevator car and a means (7; 20-22) for transmitting the driving power from the machine to the elevator car, the driving machine (4) and the control unit of the elevator being placed in a space (8) provided beside the elevator shaft (1) below the lowest landing, characterized in that said space (8) is covered at the top by an openable cover structure (25).

2. Elevator according to claim 1, **characterized** in that said cover structure forms a safety fence when opened.

3. Elevator according to claim 1 or 2 , **characterized** in that the space (8) together with its equipment is manufactured in factory and transported and installed as a complete unit.

4. Elevator according to claim 3, **characterized** in that the space (8) together with its equipment is mounted in place by encasing it in concrete.

5. Elevator according to any one of claims 1-4, **characterized** in that the machine space (8) is placed on the front side of the elevator car (2), i.e. on that side where the elevator doors are located.

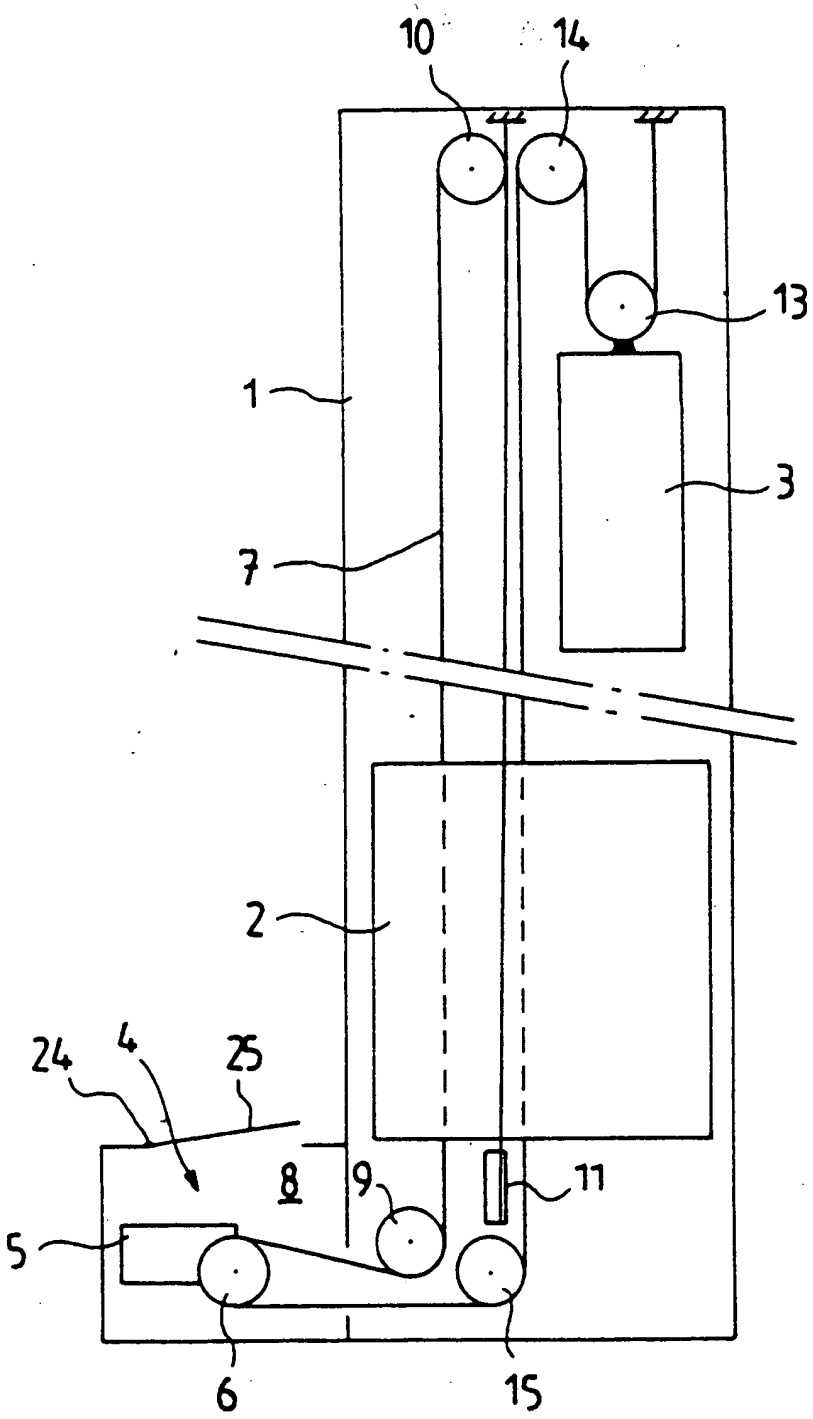

Fig.1

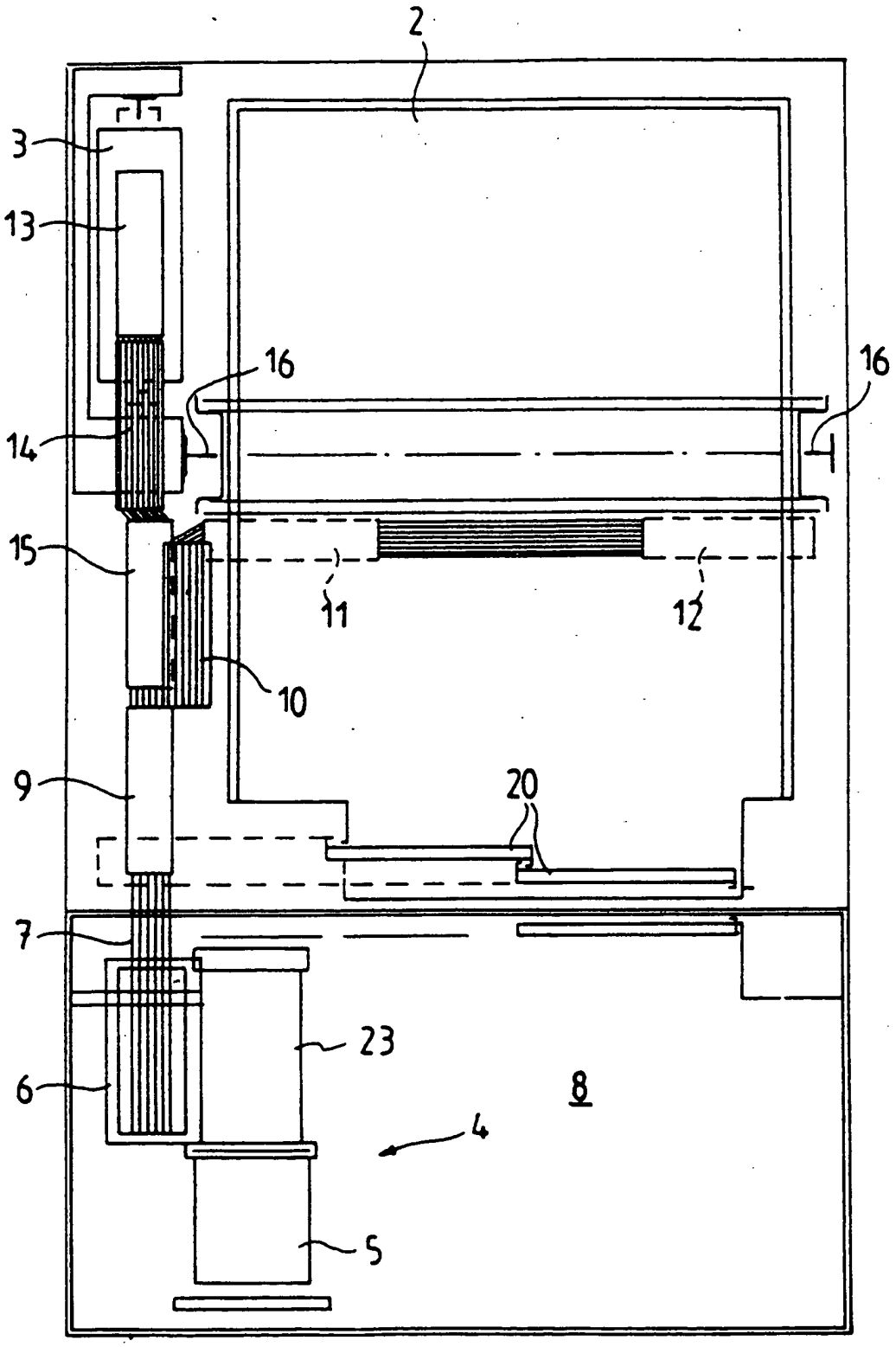

Fig.2

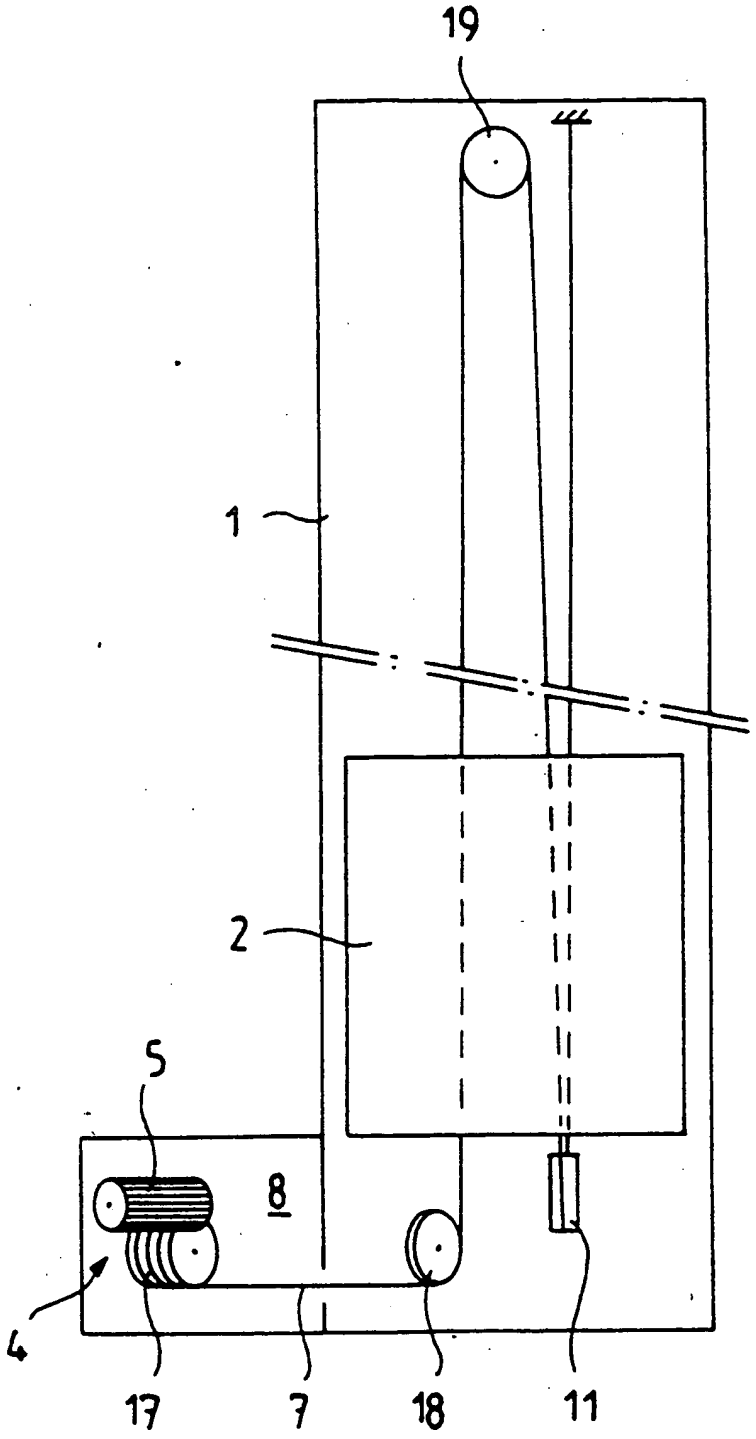

Fig.3

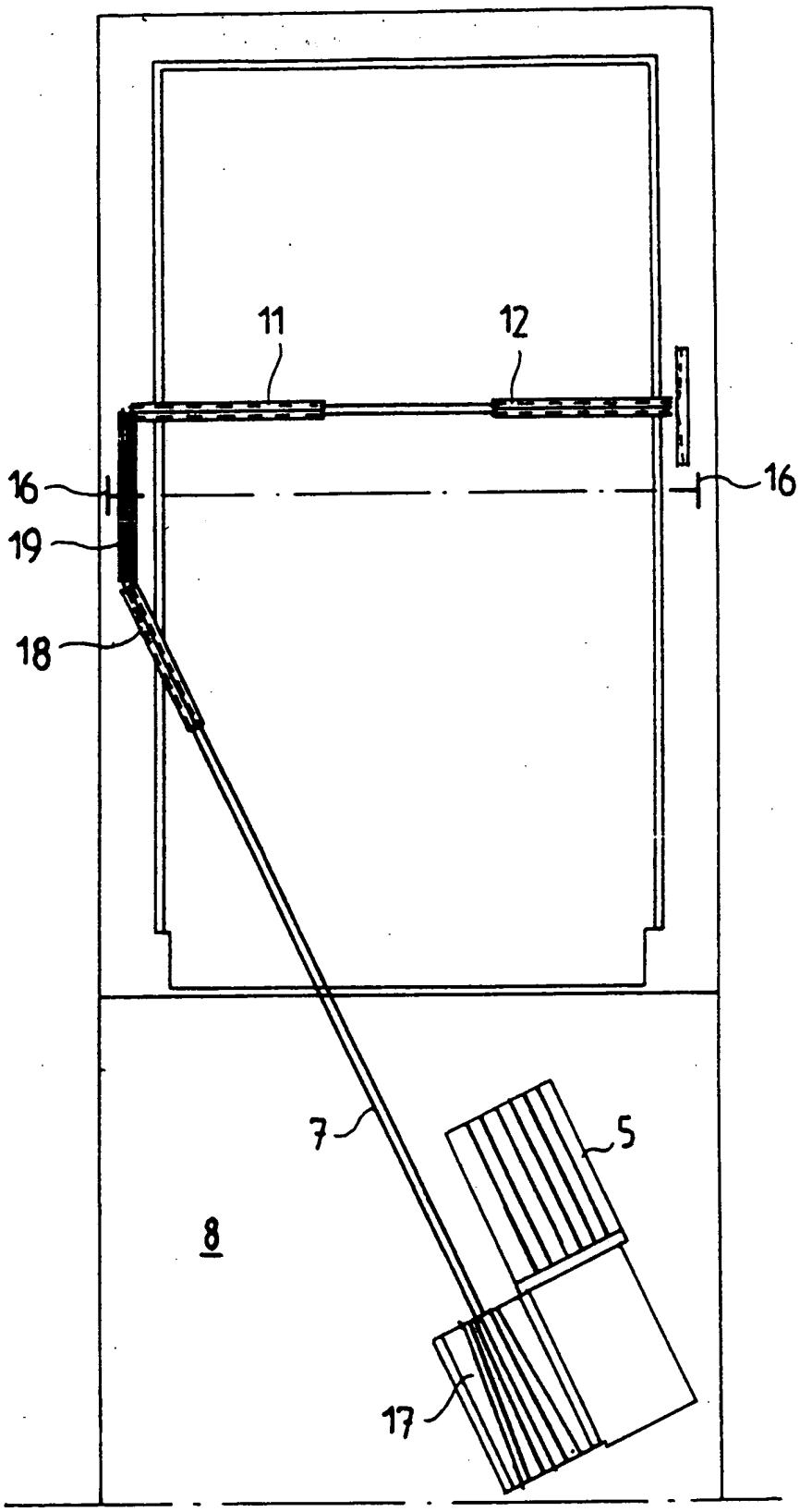

Fig.4

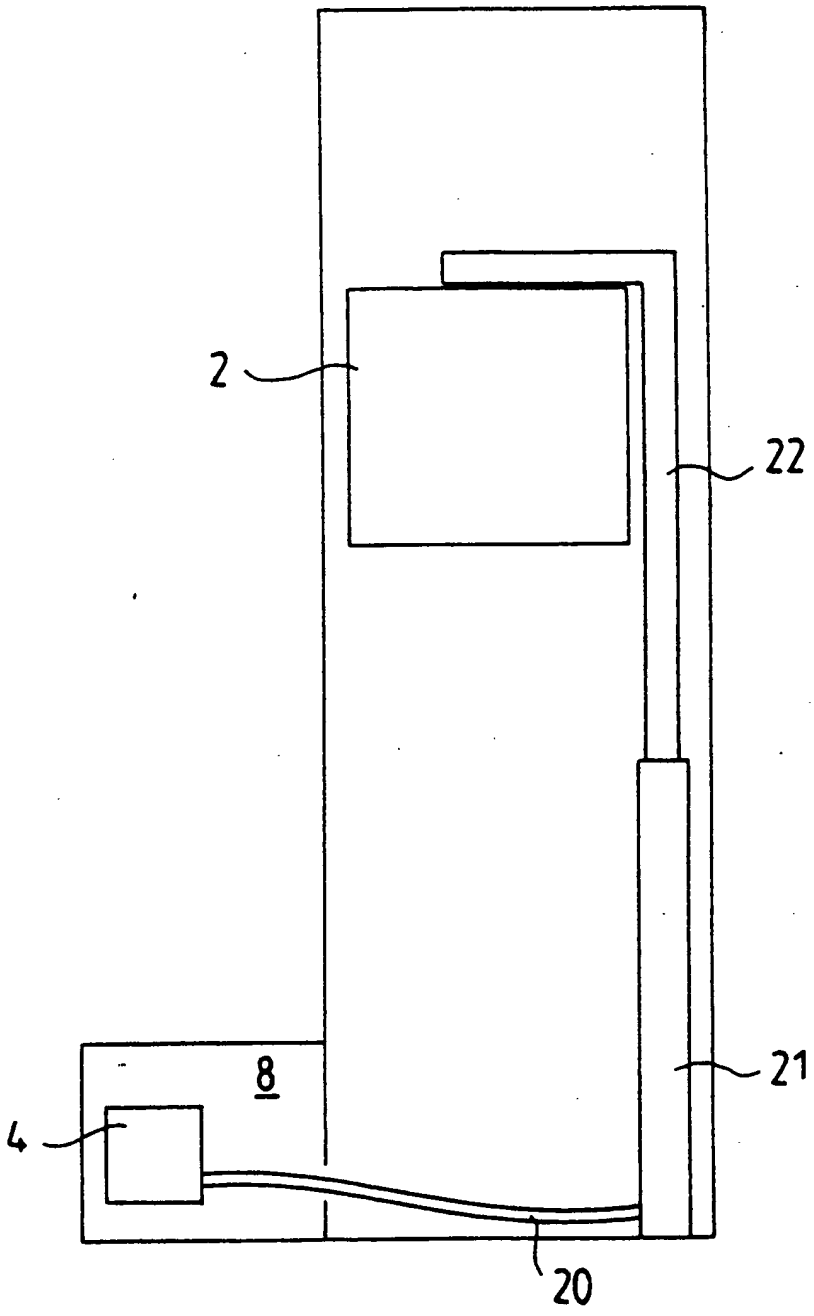

Fig.5

European Pat nt Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 11 5891

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 228 513 (USTO AUFZÜGE UND SCHALLSCHUT-ZANLAGEN GMBH) * page 4, lines 9 - 34; figures 1, 2 *	1	B 66 B 9/02
A	US-A-1 997 060 (HIRSHFELD) * page 2, lines 16 - 26; figures 1, 2 *	1	
A	US-A-2 004 060 (ALFRED T. BROWN) * page 1, right-hand column, line 54 - page 2, left-hand column, line 6; figures 1, 2 *	1	
A	US-A-2 395 735 (GRIGSBY) * page 1, right-hand column, lines 18 - 41; figure 1 *	1	
A	GB-A-2 155 904 (MITSUBISHI DENKI K.K) * page 3, line 104 - page 4, line 60; figures 11-13 *	1	
A	FR-A-2 543 933 (MITSUBISHI DENKI K.K) * figure 1 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 66 B

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	15 November 90	CLEARY F.M.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
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